

PATENT APPLN. NO. 10/600,571  
RESPONSE UNDER 37 C.F.R. §1.111

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REMARKS

Claim 17 has been amended to recite that the catalyst that is used in the process of the present invention for purifying exhaust gas from a gasoline engine of a fuel-direct-injection type removes hydrocarbons, carbon monoxide and nitrogen oxides from the exhaust gas. This amendment is based on the description on page 7, lines 16 to 17, of the specification of the present application.

New claims 26 to 32 have been added to the application. Claim 26 is based on the description in the second paragraph of page 15 of the specification of the present application. Claims 27 and 28 are based on the description in the third paragraph of page 15 through the first paragraph of page 16 of the specification of the present application. Claims 29 to 32 are based on the description in the third paragraph of page 14.

Claims 17 to 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kato et al. (U.S. Patent No. 5,402,641; hereinafter "Kato") in view of Ozawa et al. (U.S. Patent No. 5,075,276; hereinafter "Ozawa").

The invention of Kato is common with the process of the present invention in the aspect that it relates to exhaust gas treatment. However, the invention of Kato is directed to NO<sub>x</sub> absorption (see, for example, claim 1).

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On the other hand, the invention of each of the amended claims of the present application is a process for removing hydrocarbons, carbon monoxide, and nitrogen oxides from exhaust gas, and not the mere absorbtion of  $\text{NO}_x$ .

According to Kato,  $\text{NO}_x$  is absorbed when  $\text{O}_2$  decreases, and no  $\text{NO}_x$  thus absorbed is released when  $\text{O}_2$  increases (see col. 1, lines 64-68). According to Kato, the  $\text{NO}_x$  absorbent includes at least one selected from the group consisting of alkaline earth, rare earth, and alkaline metal (see col. 3, lines 61-68). Kato discloses installing a three-way catalyst in the exhaust conduit downstream of the  $\text{NO}_x$  absorbent (see claim 2).

That is, the  $\text{NO}_x$  absorbent of Kato does not remove and purify  $\text{NO}_x$  contained in the exhaust gas. The  $\text{NO}_x$  absorbent of Kato merely absorbs  $\text{NO}_x$  (when  $\text{O}_2$  contained in the exhaust gas decreases), releases the absorbed  $\text{NO}_x$  (when  $\text{O}_2$  contained in the exhaust gas increases), and treats the  $\text{NO}_x$  with a three-way catalyst installed downstream of the  $\text{NO}_x$  absorbent.

In other words, the  $\text{NO}_x$  absorbent of Kato differs in use and function from the catalyst of each of the amended claims of the present application which removes hydrocarbons, carbon monoxide, and nitrogen oxides from the exhaust gas. In particular, the invention of Kato differs from a treatment of exhaust gas in a

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gasoline engine of a fuel-direct-injection type in which the exhaust gas is under unique conditions.

Furthermore, the NO<sub>x</sub> absorbent of Katoh differs from the catalyst of each of the amended claims of the present application in that whereas the former includes an alkaline metal and the like, the latter includes a noble metal and the like.

The catalyst of each of the amended claims of the present application differs in use, function, and composition from the NO<sub>x</sub> absorbent of Katoh. Therefore, the invention of each of the amended claims of the present application cannot be easily inferred, and would not have been obvious within the meaning of 35 U.S.C. § 103(a), from the disclosure of Katoh.

The invention of Ozawa is common with the process of each of the amended claims of the present application in the aspect that it is directed to the treatment of hydrocarbons, carbon monoxide, and nitrogen oxides in exhaust gas. However, the invention of Ozawa is a technique for treating exhaust gas under the conditions that the A/F ratio is the stoichiometrical air-fuel ratio (14.7). In particular, according to the example of Ozawa, a test was conducted under an A/F ratio of 14.6, at which the fuel is in an atmosphere of excessive exhaust gas (see col. 5, lines 43 to 53).

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In Ozawa, an endurance test was conducted with use of a normal engine under conditions in which the A/F ratio was 14.6 and the inlet gas temperature was 850°C. After the endurance test, conversions were measured for HC, CO, and NO<sub>x</sub> under conditions in which the A/F ratio was 14.6 and the inlet gas temperature was 400°C (see col. 5, lines 43 to 53). That is, the invention of Ozawa is a technique that employs a normal engine. The invention of Ozawa is not a process as recited in each of the amended claims of the present application.

Furthermore, according to the invention of Ozawa, the exhaust gas is treated under conditions in which the A/F ratio is 14.6, at which the amount of fuel is greater than at the stoichiometrical air-fuel ratio. On the other hand, according to the invention of each of the amended claims of the present application, the exhaust gas is treated under conditions in which the A/F ratio is up to 50, at which the amount of air is greater than at the stoichiometrical air-fuel ratio.

The invention of each of the amended claims of the present application differs in use and function from the invention of Ozawa, and therefore completely differs from the invention of Ozawa as a technique for treating exhaust gas. Therefore, the invention

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of each of the amended claims of the present application cannot be easily inferred from the invention of Ozawa.

Since the invention of each of the amended claims of the present application differs from each of the invention of Katoh and the invention of Ozawa as described above, the invention of each of the amended claims of the present application differs even from a combination of the invention of Katoh and the invention of Ozawa. Accordingly, the invention of each of the amended claims of the present application could not have been easily made by a person skilled in the art, even on the basis of the invention of Katoh and a combination of the invention of Katoh and of the invention of Ozawa. Therefore, the invention of each of the amended claims of the present application is not obvious within the meaning of 35 U.S.C. § 103(a).

Removal of the 35 U.S.C. 103(a) rejection of the claims is believed to be in order and is respectfully requested.

The foregoing is believed to be a complete and proper response to the Office Action dated October 30, 2007, and is believed to place this application in condition for allowance. If, however, minor issues remain that can be resolved by means of a telephone interview, the Examiner is respectfully requested to contact the undersigned attorney at the telephone number indicated below.

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In the event that this paper is not considered to be timely filed, applicants hereby petitions for an appropriate extension of time. The fee for any such extension may be charged to our Deposit Account No. 111833.

In the event any additional fees are required, please also charge our Deposit Account No. 111833.

Respectfully submitted,

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